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# THE Journal of the Society of Arts, AND OF THE INSTITUTIONS IN UNION.

110TH SESSION.]

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## Proceedings of the Society.

### EXAMINATION PAPERS, 1864.

The following are the Examination Papers set in the various subjects at the Society's Final Examinations, held in April last :—

(Continued from page 690.)

#### FRENCH.

#### THREE HOURS ALLOWED.

#### PART I.

Candidates for a Third-class Certificate are to translate the following extract into English, and to answer the grammatical questions thereto annexed (in the order in which they are placed). This first part is all that will be required of them.

Fénelon, dans les sages conseils qu'il donnait à Jacques III., montrait sa haute estime pour la constitution anglaise, si forte à la fois contre le despotisme et contre l'anarchie. Il était exempt de cet étroit patriotisme qui calomnie tout ce qui existe au-delà des frontières. Son âme vertueuse avait besoin de s'étendre dans l'univers, et d'y chercher le bonheur des hommes. "J'aime mieux," disait-il, "ma famille que moi-même; j'aime mieux ma patrie que ma famille; mais j'aime encore mieux le genre humain que ma patrie." Admirable progression de sentiments et de devoirs! Des esprits faux et pervers ont abusé de ce principe; il méritait cependant d'être autorisé par Fénelon; c'est le *caritas generis humani* échappé de l'âme de Cicéron, mais démenti par les féroces conquêtes des Romains. . . . Le christianisme était digne de consacrer, par la bouche de Fénelon, une maxime que la nature a mise dans le cœur de l'homme. Quand cette vérité triomphera, nous croirons au progrès des lumières! Après tous ces cris patriotiques, qui ne sont trop souvent que les devises de l'égoïsme, les prétextes de l'ambition et les signaux de la guerre, ne criera-t-on jamais en posant les armes et par un vœu qu'il est temps d'accomplir: *Vive le genre humain!* L'humanité de Fénelon ne se bornait pas à des spéculations exagérées, à des généralités impraticables, qui supposent l'ignorance du détail des affaires humaines. Sa politique n'était pas seulement le rêve d'une âme vertueuse. Il avait vu, il avait jugé la cour et les hommes; il connaissait l'histoire de tous les siècles, il était doué d'une certaine indépendance d'esprit qui le mettait au-dessus des préjugés d'état et de nation.

VILLEMAIN.

1. Parse the first three sentences of the above extract.
2. Write the five primitive tenses of all the verbs contained above, each verb to be given in a separate line.

3. Give the noun that corresponds to each of these adjectives :—*Sages, haute, forte, exempt, étroit, vertueuse, humain, faux, pervers, féroces, dignes, patriotiques, exagérées.*

4. Give the adjective that corresponds to each of these nouns :—*Conseils, constitution, despotisme, univers, bonheur, famille, cœur, vérité, progrès, égoïsme, ambition, guerre, détail, affaires, rêve, esprit, nation.*

5. Explain *cet, son, and t*, in :—"cet étroit patriotisme;" "son âme vertueuse;" ne criera-t-on jamais."

6. Explain the past participle in :—"Une maxime que la nature a mise."

7. Show, by means of the article and a suitable epithet, the gender of each of the following nouns :—*Précipice, escompte, malaise, insignes, carrosse, vertige, cloaque, monticule, manège, écritoire.*

8. Write fully : 200 chevaux, chapitre 80, 220 personnes, page 300, 385 volumes, l'an 1200.

9. Translate :—"You trod on my toes; you trod on my dress." The rendering of these sentences in French must not be the same. Explain the difference.

10. Give with examples the rule which refers to the agreement of the adjectives *nu* and *demi*.

11. When is the preposition *by* expressed by *de*, instead of *par*, after a passive verb?

12. Explain the difference of meaning between *il s'est blessé* and *il s'est blessé lui-même*.

13. Translate :—"They will hurt one another, (1) in speaking of two only; (2) in speaking of more than two; and also, They will fight against each other, taking care to put the preposition in its right place in French.

14. Conjugate the preterit, the imperative, and present subjunctive, of *s'en aller, mourir, venir, savoir, faire, and vivre*.

#### PART II.

Candidates for a Second-class Certificate are to answer the next four grammatical questions, and to translate the English extract and idiomatic expressions which follow :—

#### I.—GRAMMAR.

1. When is *which* to be rendered by "ce qui" or "ce que," instead of simply by "qui" or "que?" Examples.

2. Show by examples how closely the logical connection of the different words in a sentence must be adhered to in French.

3. Explain *le* in the following cases :—"C'est comme je vous *le* dis;" "Il en sera comme vous *le* désirez;" "C'est meilleur que vous ne *le* pensez;" "Il est jeune, du moins il *le* paraît;" "Etes-vous son frère? Je *le* suis."

4. When should *its* and *theirs* be rendered by the personal pronoun *en* and the definite article, and not by the possessive pronouns *son, sa, ses, leur, leurs*?

#### II.—TRANSLATION.

"If time be of all things the most precious, wasting

time must be (as poor Richard says), the greatest prodigality;" since, as he elsewhere tells us, "lost time is never found again; and what we call time enough, always proves little enough." Let us, then, up and be doing, and doing to the purpose; so by diligence shall we do more with less perplexity. Sloth makes all things difficult, but industry all easy, as poor Richard says, and "He that riseth late must trot all day, and shall scarce overtake his business at night; while laziness travels so slowly that poverty soon overtakes him," as we read in poor Richard, who adds, "Drive thy business, let not that drive thee;" and, "Early to bed and early to rise, makes a man healthy, wealthy, and wise."

If we are industrious, we shall never starve; for, as poor Richard says, "At the working-man's house hunger looks in, but dares not enter." Nor will the bailiff or the constable enter; for, "Industry pays debts, but despair increaseth them," says poor Richard. What though you have found no treasure, nor has any rich relation left you a legacy, "Diligence is the mother of good luck," as poor Richard says, and "God gives all things to industry. Then plough deep while sluggards sleep, and you will have corn to sell and to keep," says poor Dick. Work while it is called to-day; for you know not how much you may be hindered to-morrow, which makes poor Richard say, "One to-day is worth two to-morrows;" and, further, "Never leave that till to-morrow which you can do to-day."

BENJAMIN FRANKLIN.

### III.—IDIOMS.

J'y perds mon latin.  
C'est un panier percé.  
J'ai eu maille à partir avec lui.  
Ils ont eu vent de la chose.  
Il ne se le laissera pas dire deux fois.  
Les maladies viennent à cheval et s'en retournent à pied.  
Aux grands portaux battent les grands vents.  
Les oreilles ont dû vous corner.  
Quoi qu'il arrive, ne jetez jamais le manche après la cognée.

Autant en emporte le vent.

### PART III.

Candidates aiming at a first-class certificate are expected to translate the above idiomatic expressions and English extracts, and to answer in French the following questions:—

LITERATURE.—1. What are the principal works of Bossuet, Boileau, and Racine?

2. Sketch the life of Fénelon.

3. Explain the spirit that pervades the writings of the great classical authors, from Molière to Fénelon, and trace it back to its source.

HISTORY.—Relate the circumstances attending the Revocation of the Edict of Nantes; and show its disastrous results.

### GERMAN.

#### THREE HOURS ALLOWED.

Each candidate is expected to translate one of the following passages, to answer some of the grammatical questions, and turn into German several of the sentences and pieces given for this purpose. Candidates for a first class must translate one piece of Section I., (e) (f) and (g), of Section II., and 19—22 inclusive of Section III., and write the essay:—

#### SECTION I.

Viglius von Zuichem von Aytta, Præsident des geheimen Rathes, Staatsrath und Siegelbewahrer, galt jetzt für den wichtigsten Mann im Senate und die mächtigste Stütze der Krone und der Tiare. Dieser verdienstvolle Greis, dem wir einige schätzbare Beiträge zu der Geschichte des niederländischen Aufbruchs verdanken, und dessen ver-

trauter Briefwechsel mit seinen Freunden uns in Erzählung derselben mehrmals geleitet hat, war einer der grössten Rechtsgelahrten seiner Zeit, dabei noch Theolog und Priester, und hatte schon unter dem Kaiser die wichtigsten Aemter bekleidet. Der Umgang mit den gelehrtesten Männern, welche jenes Zeitalter zierten, und an deren Spitze sich Erasmus von Rotterdam befand, mit öftern Reisen verbunden, die er in Geschäften des Kaisers anstellte, hatten den Kreis seiner Kenntnisse und Erfahrungen erweitert und seine Grundsätze in manchen Stücken über seine Zeiten erhoben. Der Ruhm seiner Gelehrsamkeit erfüllte sein ganzes Jahrhundert und hat seinen Namen zur Nachwelt getragen.

2. Dies Eine nur vernimm! Du zitterst jetzt  
Vor dieser lebenden Maria. Nicht  
Die lebende hast du zu fürchten. Zittre vor  
Der Todten, der Enthaupteten. Sie wird  
Vom Grab' erstehen, eine Zwietrachtsgöttin,  
Ein Rachegeist in deinem Reich herumgehn  
Und deines Volkes Herzen von dir wenden.  
Jetzt hasst der Britte die Gefürchtete;  
Er wird sie rächen, wenn sie nicht mehr ist.  
Nicht mehr die Feindin seines Glaubens, nur  
Die Enkeltochter seiner Könige,  
Des Hasses Opfer und der Eifersucht,  
Wird er in der Bejammerten erblicken!  
Schnell wirst du die Veränderung erfahren.  
Durchziehe London, wenn die blut'ge That  
Geschehen, zeige dich dem Volk, das sonst  
Sich jubelnd um dich her ergoss, du wirst  
Ein andres England sehn, ein andres Volk.

3. Wie leicht der Jüngling schwere Lasten trägt,  
Und Fehler wie den Staub vom Kleide schüttelt!  
Es wäre zu verwundern, wenn die Zauberkraft  
Der Dichtung nicht bekannter wäre, die  
Mit dem Unmöglichen so gern ihr Spiel  
Zu treiben liebt. Ob du auch so, mein Fürst,  
Ob alle deine Diener diese That  
So unbedeutend halten, zweifel' ich fast.  
Die Majestät verbreitet ihren Schutz  
Auf jeden, der sich ihr, wie einer Gottheit  
Und ihrer unverletzten Wohnung naht.  
Wie an dem Fusse des Altars, bezahlt  
Sich auf der Schwelle jede Leidenschaft.  
Da blinkt kein Schwert, da fällt kein drohend Wort,  
Da fordert selbst Beleid'gung keine Rache.  
Es bleibt das weite Feld ein offner Raum  
Für Grimm und Unverschämtheit genug.  
Dort wird kein Feiger drohn, kein Mann wird fliehn.

4. Prinz Franz Eugen stammte aus einer Seitenlinie des Savoyischen Hauses her und war in seiner Jugend zum geistlichen Stande bestimmt; aber sein Geist zog ihn zu der Betrachtung der Geschichte und in den raschen Strom des thatigen Lebens. Als zwanzigjähriger Jüngling bot er seine Dienste dem König Ludwig an; dieser, der ihn wegen seiner Kleinheit nicht der Beachtung werth fand, wies ihn ab und rieth ihm, im geistlichen Stande zu bleiben. Eugen wandte sich nach Oestreich, wo der Türkenkrieg ihm eine Bahn zu öffnen schien, und zeichnete sich bald so sehr aus, dass der Kaiser ihm nach der Befreiung von Wien im Jahre 1683, wobei er tapfer mitgefochten hatte, ein Reiterregiment verlieh. Der Herzog Karl von Lothringen erkannte schon damals den Helden in ihm. Leopold ernannte ihn im Jahre 1693 zum Feldmarschall, und nun hätte ihn der König Ludwig gern wieder für sich gewonnen; er liess ihm die Statthalterschaft von Champagne und die Würde eines Marshalls von Frankreich anbieten; aber Eugen antwortete dem Abgeordneten: "Sagen Sie Ihrem Könige, dass ich kaiserlicher Feldmarschall bin, welches eben so viel ist als der französische Marshallstab."

#### SECTION II.—GRAMMAR AND IDIOMS.

(a.) Decline the personal pronouns *er*, *sie*, *es*.

(b.) State the comparative and superlative of *gern*, *bal*, *nahe*, *hoch*, and *wohl*.

(c.) When must the pronouns *der*, *dieser*, *jener*, *welcher*, agree in gender with the substantive, and when do they not? Illustrate the rule by two examples for each pronoun.

(d.) Decline the German of: good king, this beautiful flower, my large book, in every case of the singular and plural.

(e.) State the third person singular, present and imperfect, both in the indicative and subjunctive of:—*werfen*, *gelten*, *vernehmen*, *sehen*, *tragen*, *anbieten*, *abweisen*. Add, likewise, the participle past of the preceding verbs.

(f.) When must "to be" in connection with a past participle be expressed by "*sein*," and when by "*werden*?" Illustrate the rule by three examples.

(g.) *Da geht's ja hoch her.*

*Da ging's drauf und drein.*

*Da ist's einmal lustig zugegangen.*

*Sie haben sich sehr lustig über uns gemacht.*

*Machen Sie sich's bequem.*

*Er kehrte sich nicht daran.*

*Er wollte gar nicht dran gehen, so sehr war's ihm zuwider.*

*Er schlug um jede Kleinigkeit sein Leben in die Schanze.*

*Was geht das mich an! Eines schickt sich nun einmal nicht für alle.*

*Darin hat man es in diesem Jahrhundert viel weiter gebracht.*

*Das müssen Sie sich aus dem Sinne schlagen.*

### SECTION III.

Translate into German ten of the following passages. The writing, either in English or German characters, must be very legible.

1. He knew everything except that.
  2. I should not have known him.
  3. Do come to us soon.
  4. At what o'clock did he leave town?
  5. They had gone into the country for six weeks.
  6. Will you have a glass of wine and a piece of cake?
  7. They were playing when we came into the room.
  8. Let us take a walk into the garden.
  9. He is praised by every one.
  10. This is the largest tree I ever saw.
  11. What sort of books do you now read?
  12. I, who am older than you, give you that advice.
  12. He has written his letter best of all.
  14. I offered him a large sum, but he did not accept it.
  15. The windows have not been opened yet.
  16. Not having heard of him during the last fortnight, I made up my mind to depart alone.
  17. He saved himself by jumping out of the window.
  18. She has become ill by eating too much fruit.
  19. There was much playing and dancing at my aunt's last night.
  20. We ought to have done it long ago.
  21. Would they have been able to come!
  22. A man may have lived almost an age and traversed a continent, minutely examining its curiosities, and yet, after having explored many a cavern, he may have left undetected a darker recess in his own character; he may have conversed with many people, in different languages, on numberless subjects, but having neglected those conversations with himself, by which his whole moral being should have been continually disclosed to his view, he is better qualified, perhaps, to describe the intrigues of a foreign court, or the progress of a foreign trader, to represent the manners of the Italians or the Turks, to narrate the proceedings of the Jesuits or the adventures of the gipsies, than to write the history of his own mind.
- Write in German a short essay on "The Advantages an Englishman derives from the Study of the German Language."

(To be continued.)

## Proceedings of Institutions.

**BRADFORD MECHANICS' INSTITUTE.**—The thirty-second annual report shows that as regards the number of members and financial condition, the Institute is in a very hopeful state. The present number of members is 1,317, showing an increase of 146 upon the previous year. The receipts from subscriptions have been £528 19s. 4d., and from other sources £196 3s. 6d., total £725 2s. 10d., showing an increase of £76 10s. 10d. over the previous year's income. The total expenditure has been £692 19s. 7d., being £60 11s. 8d. more than last year. The balance in hand is increased from £75 0s. 6d. to £107 3s. 9d. During the past year the committee have subscribed to the London Library Company for the loan of 100 volumes, and by this means they have been able to offer the members a larger supply of new works. The issue of the books thus obtained has averaged seventeen or eighteen per day. More money has been expended on the library than in any former year, chiefly on account of a greatly increased outlay being required for binding. The following shows the state of the library up to the 1st April, 1864:—The number of volumes in the library in the previous year was 8,332, which has been increased to 8,500. The total circulation has been 37,189, against 32,438 last year. The circulation of works of fiction was 15,962, against 12,976 last year. Among the lectures delivered were one by Geo. Dawson, Esq., on "Socrates;" one by C. P. Measor, Esq., on the "Extension of the Principles of the Factory Legislation;" one by Mr. Wheeler, on the "History of the Steam Engine;" one by Mrs. Balfour, on "Dr. Johnson and his Streatham Friends;" one by S. W. North, Esq., on "Some recent researches into the probable Antiquity of Man;" and one by Geo. Dawson, Esq., on "Sir Thomas More." The attendance was not very satisfactory. Classes in writing and arithmetic, reading (higher and lower) grammar, geography (elementary and physical) English history, mathematics, Latin, French, German, drawing, and chemistry have been in operation. The number of students on the books was 616, with an average attendance of 389. The numbers on the books, as well as those in regular attendance, have been rather greater than in the previous session; but this increase has been chiefly in the elementary classes. The advanced classes only show a slight improvement.

**NEWCASTLE-UPON-TYNE MECHANICS' INSTITUTE.**—The fortieth annual report says that the Institution has lost none of its efficiency and usefulness, and the various departments are in a satisfactory condition. A thorough revision of the members' roll has been made, and the number is now 1,005, a great portion of them being working men or their sons. 121 volumes of new books have been added to the library during the year, a considerably larger number than on the previous one. The issues during the year have been 12,135. The number of newspapers has been increased since last report. The classes in connection with the Institution have been carried on very successfully. The numbers attending the classes are:—Chemistry, 53; French, 47; Latin, 9; arithmetic and book-keeping, 11; English Grammar, 34; making a total of 154, a considerable increase over last year's attendance. The teacher reports very favourably of the chemistry class, and the results of the Government Science Examination were most satisfactory; of fifty pupils, fourteen gained prizes, and seven received honourable mention. At the Society of Arts Examination there were also several certificates awarded. There have not been so many "Readings" as reported in previous years. If few in number, however, they were eminently successful, both in the attendance of the public and the quality of the entertainment placed before them. The balance from them (including proceeds from soirée held at Christmas) was £11 4s. 8d. One half-yearly examination in oratory, under the "Thompson Bequest," has taken

place since last report, the subject was "The probable effect of the present American War on Slavery," and 1st, 2nd, and 3rd prizes were awarded. In the debating class the attendance has been good. In addition to debates, short readings and recitations have been introduced, having the effect of still more popularizing the class amongst the members generally. The committee regret the loss, by death, of the old and valued friend and treasurer of the Institution, Mr. Robert Wallace. He had held that office since 1846, and down to the time of his decease he took an active part in its management. Mr. Joseph Cowen, jun., has been elected treasurer as his successor. The balance-sheet shows that the expenditure has been £230 1s. 11d., and that there is a balance due to the treasurer of £26 18s. This is the only matter of regret referred to in the report.

#### BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—BATH, 1864.

The business of the Sections commenced on Thursday, September 15th, 1864. The following is a list of the Papers read:—

##### THURSDAY, SEPTEMBER 15TH.

##### SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

J. Glaisher.—Report on Luminous Meteors.

Professor Hennessy.—On the possible Connection between the Ellipticity of Mars and the general Appearance of its Surface.

Rev. T. W. Webb.—On a Suspected Change of Brightness in the lunar spot Werner.

W. R. Birt.—On the Importance of adopting Methods for the detection of Change on the Moon's Surface.

Rev. T. Furlong.—On the Probability of Constructing Ellipsoidal Lenses.

C. Tomlinson.—On the Cohesion Figures of Liquids.

M. Moggridge.—On an Easy Mode of Measuring Heights.

Rev. E. B. Ellman.—On the Earthquake and Storm in Sussex on the 21st of August, 1864.

##### SECTION B.—CHEMICAL SCIENCE.

Opening Address by the President.

Dr. Gladstone.—Report of the Committee on the application of Gun Cotton to Warlike Purposes.

Dr. Miller.—On the Analysis of a Hot Spring containing Lithium and Cesium in Wheel Clifford.

Dr. Daubeny.—On the Bath Waters.

Dr. Paul.—Note on some of the Constituents of the Oil known as Crude Paraffin Oil.

##### SECTION C.—GEOLOGY.

The President's Opening Address.

W. Sanders.—A brief Explanation of a Geological Map of the neighbourhood of Bristol and Bath.

Professor Phillips.—Measures of Geological Time by Natural Chronometers, with a communication from M. Morlet.

H. C. Sorby.—On the conclusion to be deduced from the Physical Structure of some Meteorites.

H. Woodward.—On the family Eurypteridæ, with description of some new genera and species.

H. C. Salmon.—On the Geognostic relations of the Auriferous Quartz of Nova Scotia.

F. Von Hauer.—A Notice of the latest Labours of the Imperial Geological Institute of the Austrian Empire.

Sir R. I. Murchison.—Note on the occurrence of the same Fossil Plants in the Permian Rocks of Westmoreland and Durham.

W. Pengelly.—On Changes of Relative Level of Land and Sea in south-western Devonshire, in connection with the Antiquity of Mankind.

##### SECTION D.—ZOOLOGY AND BOTANY.

The President.—Inaugural Address.

T. Spencer Cobbold, M.D., F.R.S.—Report of Experiments respecting the Development and Migration of the Entozoa.

J. Gwyn Jeffreys, F.R.S.—Further Report on Shetland Dredging.

J. Gwyn Jeffreys, F.R.S.—Remarks on *Stylifer*, a genus of quasi-parasitic Mollusca, with particulars of the European species *S. Turtoni*.

Francis Galton, F.R.S.—First steps towards the Domestication of Animals.

##### SUB-SECTION D.—PHYSIOLOGY.

President's Address.—On the Present State of the Dietary Question.

Rev. J. Slatter.—On the Dietary of the Agricultural Poor.

G. D. Gibb, M.D.—On the Various Forms assumed by the Glottis.

W. Turner, M.B.—On a Supplementary System of Nutrient Arteries for the Lungs.

W. E. C. Nourse.—On the Action of the Nervous Tissue concerned in Perception.

##### SECTION E.—GEOGRAPHY AND ETHNOLOGY.

The President's Address.

Rev. H. B. Tristram.—On the Physical and Political Geography of the Jordan Valley and Eastern Palestine.

Rev. G. Clowes.—On the Western Shores of the Dead Sea.

Alexander Michie.—Notes on China, Mongolia, and Siberia.

M. Vambery.—On the Turcoman Tribes of Central Asia.

M. Nicolas de Khanikof.—On the Ethnology of the Iranian Race.

M. Alexander Hippius.—Russian Trade with Bokhara.

##### SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

The President's Address.

The Recorder of Bath.—Statistics of Crime and Criminals.

Professor Levi.—Statistics of the Number and Occupations of Foreigners in England.

##### SECTION G.—MECHANICAL SCIENCE.

The President's Address.

James Oldham.—Report of the Committee on Tidal Observations on the Humber, the Trent, and the Yorkshire Ouse.

Wm. Fairbairn, LL.D., F.R.S.—On the Mechanical Properties of the Atlantic Telegraph Cable.

Admiral Sir Edward Belcher, communicated by Capt. Doty, of the Confederate States.—On Torpedoes used by the Confederate States in the Destruction of some of the Federal Vessels of War, and the Mode of attaching them to the Rams.

Capt. Wheatley, R.N.—On Revolving Sails.

Capt. Wheatley, R.N.—On Plated Ships and their Armament.

In the evening a conversazione took place in the Assembly Rooms.

##### FRIDAY, SEPTEMBER 16TH, 1864.

##### SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Dr. Gladstone.—Report of Committee on Fog Signals.

Dr. Gladstone.—On the Transmission of the Red Ray by many-coloured Solutions.

C. Cator.—On a new Anemometer.

Professor Rankine.—On the Properties of certain Stream-lines.

- W. H. L. Russell.—On Symbolical Expansions.  
 Professor Cayley.—On a Formula of M. Chasles relating to the Contact of Conics.  
 Professor Cayley.—On the Problem of the in-and-circumscribed Triangle.  
 T. A. Hirst.—On the Generalisation of the method of Geometrical Inversion.  
 A. J. Ellis.—On Stigmatics.  
 Dr. Stevelly.—On a Mode of Determining the Velocity of Sound.  
 Professor Phillips.—Notice of the Physical Aspect of the Sun.

## SECTION B.—CHEMICAL SCIENCE.

- Rev. G. F. Browne.—On the Prismatic Formation of Ice.  
 A. R. Catton.—On the direct Conversion of Acetic Acid into Butyric and Caproic Acids.  
 Dr. W. Bird Herapath.—On a new method of Discovering the Hydrogen Compounds of Arsenic, Sulphur, Antimony, and Phosphorus, when in company as a mixed gas.  
 Dr. T. Anderson.—On some Bituminous Substances.  
 Stewart Clark.—Description of an Apparatus for Estimating the Organic Impurities in Atmospheric Air and in Water.  
 Dr. Stevenson Macadam.—On the Pollution of Rivers by the Sewage of Towns.  
 Dr. Henry Bird.—On the Utilisation of Sewage.

## SECTION C.—GEOLOGY.

- C. Moore.—Remarks on the Geology of the South-West of England.  
 H. B. Brady.—On the Foraminifera of the Middle and Upper Lias of Somersetshire.  
 Professor Harkness.—On the Lower Silurian Rocks of the South-East of Cumberland and the North-East of Westmoreland.  
 Rev. G. F. Browne.—On the Formation and Condition of Ice in certain Ice Caves of the Jura, Vosgian Jura, Dauphiné, and Savoy.  
 W. W. Stoddart.—On the Lowest Beds of the Clifton Carboniferous Series.  
 Handel Cossham.—On the Geological Formation of the district around Kingswood Hill, with especial reference to supposed Development of Millstone Grit in that neighbourhood.

## SECTION D.—ZOOLOGY AND BOTANY.

- Dr. Edward Crisp.—Contributions to the Anatomy of the Quadrumana, with a comparative estimate of the Intelligence of the Apes and Monkeys.  
 Dr. G. D. Gibb.—Special Differences between the Larynx of the Negro and that of the White Man.  
 Rev. H. B. Tristram, F.L.S.—On the Ornithology of Palestine, and the Peculiarities of the Jordan Valley.  
 Dr. Scott.—On the *Turdus torquatus* as observed in Devonshire.  
 Dr. Herapath, F.R.S.—On the genus *Synapta*.

## SUB-SECTION D.—PHYSIOLOGY.

- M. Foster, M.D.—Report on Muscular Irritability.  
 R. Boyd, M.D.—Observations on the Measurements of the Head and Weight of the Brain in 696 Cases of Insanity.  
 W. Turner, M.B.—On Cranial Deformities. Trigonoccephalus.  
 J. Thurnam, M.D.—On the Obliteration of the Sutures in one class of Ancient British Skulls.  
 W. B. Herapath, M.D.—On the presence of Indigo in Purulent Discharges.  
 John Davy, M.D.—On the Temperature of the Sexes.  
 T. S. Prideaux.—On the Functions of the Cerebellum.

## SECTION E.—GEOGRAPHY AND ETHNOLOGY.

- Capt. R. F. Burton.—Ethnology of Dahomey.

- John Petherick.—Latest News from Mr. S. Baker, the Traveller in Central Africa.  
 James Fox Wilson.—Increasing Desiccation of Inner Southern Africa.  
 Dr. Thomas Hodgkin.—Growth of Desert in Morocco.  
 John Crawford.—On the Early Migrations of Man.  
 R. Stuart Poole.—On the Ethnic Relations of the Egyptian Race.

## SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

- James Heywood.—Report of a Committee of the British Association, on Uniformity of Weights and Measures. (A Deputation from the Chemical Section attended on the presentation of this Report.)  
 Col. Torrens.—On the System of Land-transfer in Australia.  
 Samuel Brown.—On the Mortality of Europeans in India.  
 Edward Spender.—On the "Truck-system" in some parts of the West of England.  
 W. Chetwynd.—On the Progress of Postal Banks (Post Office Savings Banks).

## SECTION G.—MECHANICAL SCIENCE.

- Professor Rankine, F.R.S.—Report of the Committee for experimenting on the resistance of bodies moving under water, as compared with that of bodies floating on the surface.  
 T. Webster, F.R.S.—Report of the Committee on the Patent Laws.  
 Peter W. Barlow, C.E., F.R.S.—On the Power required to overcome the Vis Inertiæ of Railway Trains, with description of Machine to propel Trains between Stations without Locomotives.  
 Captain Selwyn, R.N.—On Submarine Telegraphy.  
 W. Symons.—On the Working of Underground Railways by means of Hydraulic Power.

In the evening Professor Roscoe delivered a discourse "On the Chemical Action of Light."

## SATURDAY, SEPTEMBER 17TH.

## SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

- J. B. Thompson.—On the Mechanical Theory and Application of the Laws of Magnetic Induction and Electricity.  
 H. Keevil.—On the Development of Electricity from the Rays of the Sun and other Sources of Light.  
 J. G. Symons.—On the Fall of Rain in the British Isles.  
 Rev. L. Jenyns.—On the Temperature and Rainfall of Bath.  
 A. Catton.—On the Rhombohedral System in Crystallography.  
 R. A. Peacock.—On a New Formula for Calculating the Initial Pressure of Steam.  
 A. Catton.—On the Connection between the Form and Optical Properties of Crystals.

## SECTION B.—CHEMICAL SCIENCE.

(On account of the Excursion, this Section did not meet on Saturday.)

## SECTION C.—GEOLOGY.

- W. H. Baily.—On the Occurrence of Fish Remains in the Old Red Sandstone of Portishead, near Bristol.  
 Rev. P. B. Brodie.—Remarks on two Outliers of Lias in South Warwickshire, and on the presence of the Lias or Rhoetic Bone-bed at Knowle, its furthest northern extension hitherto recognised.  
 C. W. Peach.—On Traces of Glacial Drifts in the Shetland Islands.  
 C. W. Peach.—On Boulder Clay Fossils.  
 J. Leckenby.—On the Boulder Clay and Drifts of Scarborough and East Yorkshire.

Dr. Daubeny.—On the Cause of the Extrication of Carbonic Acid from the Interior of the Earth, and on its Chemical Action upon the constituents of Felspathic Rocks.

Commander B. Pim, R.N.—Notes on the Volcanic Phenomena and Mineral and Thermal Waters of Nicaragua.

J. W. Salter.—On the old Pre-Cambrian (Laurentian) Island of St. David's, Pembrokeshire.

J. W. Salter.—On some New Forms of Olenoid Trilobites from the lowest Fossiliferous Rocks of Wales.

W. H. Baily.—On some New Points in the Structure of *Palæchinus*.

#### SECTION D.—ZOOLOGY AND BOTANY.

(This Section did not meet on Saturday owing to Excursions.)

##### SUB-SECTION D.—PHYSIOLOGY.

The President.—On the Combination of Food in the Meals of the Labouring Classes.

B. W. Richardson, M.D.—On the Inhalation of Oxygen Gas.

G. D. Gibb, M.D.—Note on the Action of the Bromides of Lithium and Zinc.

R. Garner, F.L.S.—On a Vocal Organ of an Aquatic Insect.

John Goodman, M.D.—The Functions of the Liver.

L. T. A. Carter, M.D.—On the Lymphatics in the Liver of Man and the Pig.

E. Crisp, M.D.—On the presence of Valves in the Abdominal Veins.

#### SECTION E.—GEOGRAPHY AND ETHNOLOGY.

Viscount Milton and Dr. Cheadle.—An Expedition across the Rocky Mountains into British Columbia, by the Yellow Head or Leather Pass.

Richard Spruce.—On the Physical Geography of the Peruvian Coast Valleys of Chira and Piura, and the adjacent Deserts.

Richard Spruce.—On the River Purus, a great affluent of the Amazons.

H. W. Bates.—On the Formation of the Delta of the Amazons.

Kenneth Macleay.—A remarkable Storm and Beach Wave at St. Shotts, Newfoundland.

John Crawford.—On the supposed Stone, Bronze, and Iron Ages of Society.

Dr. Henry Bird.—An account of the Human Bones found in Tumuli, situated in the Cotteswold Hills.

#### SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

A. B. Middleton.—Sanitary Statistics of Salisbury.

Dr. J. A. Symonds.—Sanitary Statistics of Clifton.

R. T. Gore.—On the Mortality of the City of Bath.

#### SECTION G.—MECHANICAL SCIENCE.

(This Section did not meet on Saturday owing to Excursions.)

#### MONDAY, SEPTEMBER 19TH.

##### SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Col. Sykes.—Report of the Balloon Committee.

J. Glaisher.—Account of Balloon Ascents.

T. A. Hirst.—On a Transformation of Plane Curves recently proposed by Professor Cremona.

A. Claudet.—On Photosculpture.

W. Huggins and Dr. Miller.—On the Spectra of some of the Heavenly Bodies.

Fleeming Jenkin.—On the Retardation of Electrical Signals on Land Lines.

Dr. Lee.—On an extensive lunar Plain near the Montes Hercynii, which it is proposed to name Otto Struve.

J. J. Walker.—On two of the Conditions of the Resolvability of a Ternary Cubic Form into Linear Factors.

G. Griffith.—Report of Committee on the Transmutation of Spectral Rays.

Fleeming Jenkin.—Interim Report on Thermo-Electric Phenomena.

#### SECTION B.—CHEMICAL SCIENCE.

W. Poole King.—On the Premature Decay of the Frescoes in the Houses of Parliament, its Cause, and Remedy.

Maxwell Lyte.—On an apparatus for the preservation or disengagement of sulphuretted hydrogen, carbonic acid, or other gases.

Dr. Phipson.—On the Black Stones which fell from the Atmosphere at Birmingham.

F. Crace Calvert, F.R.S., F.C.S.—On a new method of extracting Gold from Auriferous Ores.

Dr. Phipson.—On the Medicinal Muds of the Island of Ischia.

Professor Tennant.—On the Colouring of Agates.

Alphonse Gages.—On the Artificial Production of Anhydrite.

Fredk. Field.—On a Specimen of Tin Ore hitherto undescribed.

P. Spence.—On Copper Smelting.

Dr. Machattie.—On the presence of Nickel in Metallic Lead.

Dr. Machattie.—A Suggestion on the Detection of Poisons by Dialysis.

Dr. Sullivan.—On the Precipitation of Aluminous Silicates from Solution.

Professor Wanklyn.—On the Rational Formula of Rosaniline.

Professor Wanklyn.—On the Composition of certain Organic Dyes.

A. R. Catton.—On the Molecular Constitution of Carbon Compounds.

#### SECTION C.—GEOLOGY.

Rev. H. B. Tristram.—On a Bone-breccia with Flints found in the Lebanon.

Rev. H. B. Tristram.—On the Formation of the Jordan Valley and the Dead Sea.

Rev. H. B. Tristram.—Notice of a Bitumen and Sulphur Deposit at the South-west corner of the Dead Sea.

Rev. H. B. Tristram.—On the Geology of Palestine.

Dr. Hector.—On the Geology of Otago, New Zealand.

W. Keene.—On the Coal Measures of New South Wales.

J. Mackenzie.—On the New South Wales Coal Field.

J. Randall.—On the Position in the Great Oolite, and the Mode of Working, of the Bath Freestone.

H. Seeley.—On the Significance of the Sequence of Rocks and Fossils.

E. R. Lankester.—On the Species of the Genus *Pteraspis*.

Dr. T. Wright.—On the White Lias of Dorsetshire.

#### SECTION D.—ZOOLOGY AND BOTANY.

E. Ray Lankester.—On certain points in the anatomy of the Earth Worm.

W. A. Sanford.—Notice of a New British Rhizopod and some other marine animals.

Dr. Daubeny.—On the Decay of Species, and the Natural Provision for extending their Duration.

Frank Buckland.—On the Natural History of the Oyster.

John Davy, M.D.—Some observations on the Salmonidæ, chiefly relating to their generative function.

Thomas Johnson.—An Account of the Successful Accomplishment of the Plan to transport Salmon Ova to Australia.

Rev. Thomas Hincks.—On some New Hydroid

Zoophytes, and on the Classification and Terminology of the Hydroids.

Rev. Thomas Hincks.—On the Medusoid of a Tubularian Zoophyte, and its return to the fixed condition after the liberation of the Ova.

Dr. J. E. Gray.—On the Whalebone Whale of the British Coasts.

Dr. J. E. Gray.—On New Corals from the Shetlands.

#### SUB-SECTION D.—PHYSIOLOGY.

The President.—What is the Best Method of estimating the Nutritive Value of Foods and Dietaries?

The President.—Nutritive elements in the Dietary of the Labouring Classes.

Thomas Hayden, M.D.—The relative and special applications of Fat and Sugar as Respiratory Food.

George Frean.—The use of Milk and Scotch Barley as an Article of Diet.

Francis Barham.—The alimentary character of Nitrogen Gas.

T. S. Cobbold, M.D.—Meat as a source of Entozoa.

C. G. Monteith.—On the Lentil as an Article of Food, and its use from the earliest historical time.

#### SECTION E.—GEOGRAPHY AND ETHNOLOGY.

A. R. Wallace.—Progress of Civilisation in Northern Celebes.

Lieut.-Colonel Showers.—On the Meenas, a wild tribe of Central India.

Miss Muir Mackenzie.—A Narrative of her Journeys in the South Slavonic countries of Austria and Turkey in Europe.

Sir Robert Schomburgk.—A Journey to Xiengmai and Moulmein.

Dr. A. Bastian.—Ethnology of Cambodia.

John Crawford.—On Human Hybrids or Crosses.

Dr. Shortt.—On some rude tribes supposed to be Aborigines of Southern India.

#### SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

Major-General Hannington.—Some remarks on the French Calculating Machine. (The machine itself was exhibited.)

The President.—Life Tables, by the Swedish Calculating Machine (with Photographs of the Machine by A. Claudet).

Professor Fawcett.—On the Causes which produce the present high rate of Discount.

Professor Levi.—Statistics relating to the Royal Navy.

E. B. Elliott.—Military Statistics of certain Armies, especially of those of the United States.

J. Wilson.—Registration of Births and Deaths in Ireland.

Handel Cossham.—Statistics of the Coal Trade:—Colliers employed, Wages paid, and Social Condition of the Miners employed in the Northern portion of the Bristol Coal Field.

#### SECTION G.—MECHANICAL SCIENCE.

James Heywood.—Report of the Committee on Uniformity of Weights and Measures.

(Deputations from Sections B. and F. attended).

Professor Rankine, F.R.S.—On Units of Measure.

J. Scott Russell, F.R.S.—Report of the Committee on Gun Cotton.

J. L. Stothert and R. Pitt.—On a Machine for Testing Girders.

J. Symes Prideaux.—On the Construction of Shot Proof Targets.

In the evening at the theatre, Dr. Livingstone gave an account of his explorations in South Africa during the last six years. In order to accommodate the members who were unable to get seats in the theatre, arrangements were made for Dr. Livingstone's account being read

simultaneously by Mr. Clements Markham, Honorary Secretary to the Royal Geographical Society, in the Mineral Water Hospital. Both places were filled to overflowing.

#### TUESDAY, SEPTEMBER 20TH.

##### SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Fleeming Jenkin.—Report of Committee on Electrical Standards.

Professor Hennessy.—Report on the Vertical Movements of the Atmosphere.

J. P. Gassiot.—On the Adaptation of Sulphide of Carbon Prisms, and the use of Telescopes of a long focal distance in the examination of the Sun's Spectrum.

J. Browning.—On a New Form of Spectroscope, in which Direct Vision is obtained with Single Prism.

Professor W. B. Rogers.—An Account of Ritchie's Improvements in the Liquid Compass.

J. Glaisher.—On a New Arrangement for Measuring the Rate of Evaporation by R. von Vinenot.

Professor Hennessy.—On the Regression of Temperature during the month of May.

Fleeming Jenkin.—Description of Electric Resistance Balance constructed by Professor W. Thomson.

Rev. T. W. Webb.—On the Invisible Part of the Moon's Surface.

Rev. W. R. Dawes.—On the Present Aspect of the Discussion respecting the Telescopic appearance of the Sun's Photosphere.

J. J. Walker.—On a Recent Description of an Iris seen in the Lake of Lucerne.

A. Waugh.—On the Spectrum of Polarised Light.

S. Highley.—Description of a Cheap Form of Automatic Regulator for the Electric Light.

R. W. Hardy.—Speculations on Physical Astronomy.

J. Hartnup.—On the Great Storm of December 3rd, 1863, as observed at the Liverpool Observatory.

— Brothers.—Exhibited some Enlarged Photographs of the Moon.

##### SECTION B.—CHEMICAL SCIENCE.

Professor Wanklyn.—On a Curious Example of Etherification.

A. V. Harcourt.—An Account of some Experiments on the Rate of Chemical Change.

T. Fairley.—On the Action of Hydrogen upon Organic Polycyanides.

Professor W. B. Rogers.—An Account of Apparatus and Processes for the Chemical and Photometrical Testing of Illuminating Gas.

Professor Roscoe.—Description of a Chemical Photometer for Meteorological Observation.

Professor Roscoe.—Contributions towards the Foundation of a Quantitative Photography.

Dr. Paul.—On Useful Applications of Slag from Iron Smelting.

Dr. Williamson.—On Isomorphism.

##### SECTION C.—GEOLOGY.

Preliminary Report of the Committee.—On the Distribution of the Organic Remains of the North Staffordshire Coalfield.

Sir W. Logan, Dr. Dawson, and Dr. Sterry Hunt.—On Organic Remains in Laurentian Rocks in Canada.

W. A. Sanford.—Notice of Carnassial and Canine Teeth from the Mendip Caves, which probably belong to *Felis antiqua*.

W. Boyd Dawkins.—On the newer Pliocene Fauna of the Caverns and River Deposits of Somersetshire.

Dr. Falconer.—On Fossil and Human Remains of the Gibraltar Cave.

Professor Phillips.—On Distribution of Granite Blocks from Wasdale Crag.



Professor Phillips.—On Excavation of Valleys near Kirby Lonsdale.

Professor W. B. Rogers.—To Exhibit the Cast of a Peculiar Fossil found in Mesozoic Sandstone of the Connecticut Valley.

#### SECTION D.—ZOOLOGY AND BOTANY.

Dr. Muller.—On *Euphorbiaceæ*.

Dr. E. Perceval Wright.—To exhibit Professor T. Huxley's and Mr. Hawkins's "Comparative Osteology."

Dr. E. Gray.—To exhibit Von Beneden's Work on the Marine Leeches of the Coast of Brest.

Dr. Herapath, F.R.S.—On the Pedicellariæ of the *Echinodermata*.

C. Spence Bate, F.R.S.—On a Human Skull and the Bones of Animals found with Pottery in a Kjökkenmødding, on the Coast of Cornwall.

C. Spence Bate.—On an Ancient Cornish Barrow.

Rev. A. Merle Norman.—Shetland Dredging Report, on the *Echinodermata* of the Shetland Sea.

G. S. Brady.—Report of the Dredging Operations on the Coasts of Northumberland and Durham.

Professor Balfour.—Notice of some Rare Scotch Plants and their Localities.

Jas. Buckman.—On *Datura Stramonium* and *D. Tatula*.

Richard Beck.—Observations on the Spinnirets of Spiders.

J. E. Daniell.—The Mollusca of Bath and an account of a Parasite found in *Anodon Cygnea*.

B. Beddoe, M.D.—On the Testimony of Local Phenomena to the Permanence of Type.

Dr. Baillie.—Extract of a letter from, relative to *Manatus Vogelii*.

M. Moggridge.—The old Welsh Mistletoe Cure for St. Vitus's Dance.

R. Riddell.—On *Balata* and other Gums regarded as Substitutes for Gutta Serena.

C. Ottley Groom.—On the Food of Birds.

#### SUB-SECTION D.—PHYSIOLOGY.

J. Hughes Bennett, M.D., F.R.S.E.—The exhibition of a New Sphygmograph, by M. Marey.

B. W. Richardson, M.D.—Report on the Nitrate of Amyle.

J. T. Dickson.—Cell Theories.

John Davy, M.D., F.R.S.—Some Observations on the Horse Chestnut—its composition and uses.

T. S. Cobbold, M.D., F.R.S.—On Vegetables and Fruit as a source of Entozoa.

T. S. Cobbold, M.D., F.R.S.—On Water as a source of Entozoa.

A. Haviland.—The Hour of Death in Acute and Chronic Disease.

T. Junod, M.D.—On the Physiological Effect of the Vacuum Apparatus.

B. W. Richardson, M.D.—The Physiological Effects of Tobacco.

E. Crisp, M.D.—On the Size of the Blood Corpuscles in relation to the Size of the Animal.

#### SECTION E.—GEOGRAPHY AND ETHNOLOGY.

Captain Burton.—On the River Congo.

M'Douall Stuart.—Account of his Journey across Australia.

Albert Walker.—Journey along the West Coast of Middle Island, New Zealand.

J. G. Taylor, H.M. Consul at Diabekir—Notes on Kurdistan.

Sir C. Elliot.—On a recent Earthquake at St. Helena.

Charles M. Doughty.—On the "Jostedal Brae," a Glacial System in Southern Norway.

T. Farrar.—Fixity of the Types of Man.

Professor Harley.—On the Poisoned Arrows of Savage Man.

#### SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

T. Webster and J. F. Bateman.—Report on Scientific Evidence in Courts of Judicature.

Dr. Wilson.—Sanitary Statistics of Cheltenham.

Rev. Dr. Hume.—On the Locality of the various Religious Bodies in Ireland.

F. Purdy.—On the Quantity and Value of Grain imported into the United Kingdom since the Repeal of the Corn Laws.

M. Guerry, of the Institute of France.—On Crime in England and France.

James Heywood, F.R.S.—On the Recommendations of the Public School Commissioners for the Distribution of School Time.

Lieut.-Colonel Kennedy.—On the British Home and Colonial Empire in its Mutual Relations.

W. Tite, M.P.—Health Statistics of the City of Paris.

W. Westgarth.—Statistics of Crime in Australia.

I. Pitman.—On Brief Writing.

Col. Grant, R.E.—Notes on a Cotton Chart, showing the effect of the Civil War in America on Cotton.

R. Herbert.—Statistics of Live Stock.

#### SECTION G.—MECHANICAL SCIENCE.

Professor Rankine, F.R.S.—On some of the Strains of Ships.

George Fawcett.—Improvements in Scaling and other Ladders.

George Fawcett.—Improvements in Folding Doors.

Captain A. Henderson.—On the Practical Progress of Naval Architecture in Ocean and River Steamers, with Suggestions for Improvements in the Steerage of the Great Eastern, and large and small Iron-clads, Rams, and Gun-boats, similar to the Assam Nautilus, by the use of Balanced Rudders in bow and stern.

Admiral Sir E. Belcher.—On Improvements in the Structure of Ships of War.

Capt. Wheatley, R.N.—On Improvements in the Defence of Ships of War.

Zerah Colburn.—On Steam Boilers.

George Glover.—On Instruments for the Measurement of Gas.

James Williams.—Experiments on the Elasticity of Iron.

H. C. Sorby, F.R.S.—Exhibited and described Microscopical Photographs of various kinds of Iron and Steel.

R. A. Peacock.—On Testing Cables.

George Bell Galloway.—On Life Boats for Ships and Steamers.

George Bell Galloway.—On Improvements in Screw Propellers.

Edward Charlesworth.—The new Elevator Gun.

G. Hartmann.—Description of a Parallel Gauge.

In the evening a Microscopical Soirée took place in the Assembly-rooms, which was very numerously attended.

WEDNESDAY, SEPTEMBER 21st, 1864.

#### SECTION B.—CHEMICAL SCIENCE.

Dr. G. Kemp.—Memorandum on Ozone.

Wentworth Scott.—On some probable new Sources of Thallium.

Professor W. B. Rogers.—To exhibit the inventions of Mr. Cornelius, of Philadelphia, for Lighting Gas Burners by Electricity.

A. C. Kirk.—On the Production of Cold by the Expansion of Air.

S. Mossman.—Some observations on the Constitution of the Atmosphere.

W. Gee.—Account of the mode adopted at the Bradford Union for the Utilization of Sewage.

Dr. Paul.—On the Disposal of Town Refuse.

Alfred Noble.—On Reaumur's Porcelain.

S. Highley.—Description of a cheap form of Automatic Regulator for the Electric Light.

#### SECTION C.—GEOLOGY.

W. Bristow.—On the Rhœtic (or Penarth) Beds of the Neighbourhood of Bristol and the South-west of England.

Professor Hennessy.—On Geological Climate.

Dr. T. Hodgkin.—Notice of some Geological Appearances in the North-west of Morocco.

Dr. R. N. Rubridge.—On the Relations of the Silurian Schist with the Quartzose Rocks of South Africa.

Dr. T. Wright.—On the Development of Ammonites.

H. Seely.—On the Pterodactyle as Evidence of a new Sub-class of Vertebrata.

M. Hébert.—Note on some of the Oolitic Strata seen at Dundry.

W. W. Smyth.—On the Thermal Water of the Clifford Amalgamated Mines of Cornwall.

A. Bassett.—On the South Wales Mineral Basin.

E. S. Higgins.—On Otolites.

H. C. Hodge.—On the Origin of certain Rocks, and on the Ossiferous Caverns of South Devonshire.

Professor Tennant.—On Agates found on our Coasts.

Dr. P. Carpenter.—On the Connections between the Crag Formations and the recent Faunas of the North Pacific.

#### SECTION D.—ZOOLOGY AND BOTANY.

D. W. Brittain.—On the Development of Cysticercus.

Harry Seely.—Significance of the Septa, and Siphuncules of Cephalopod Shells.

Professor Buckman, F.L.S.—On a curious Form of *Aquilegia vulgaris*.

Samuel Highley, F.G.S.—On the Application of Photography and the Magic Lantern to Class Demonstrations in Microscopic Science and Natural History.

Professor Balfour.—To exhibit Specimens of *Cycas revoluta*, *C. Circinalis*, and *Cerotozomia Mexicana*, and to make remarks thereon.

George Busk, F.R.S.—On a very Ancient Human Cranium from Gibraltar.

Frank Buckland.—On Salmon Hatching and Salmon Ladders.

Thomas Wright, M.D.—Notice of a New Entomostrecon from Plymouth.

Frederick R. Surtees.—On South African Swifts and Swallows.

R. F. Wright.—To exhibit some Trap-door Spiders from Corfu.

#### SUB-SECTION D.—PHYSIOLOGY.

J. Hughes Bennett, M.D., F.R.S.E.—The Physiological Aspect of the Sewerage Question.

#### SECTION E.—GEOGRAPHY AND ETHNOLOGY.

M. Vámbéry.—A Visit to Samarcand.

John Crawford.—On the Sources of the Supply of Tin for the Bronze Weapons of Antiquity.

Samuel Mossman.—On the Atmosphere, showing that there is a difference in its vital constituents North and South of the Equator.

Hyde Clarke.—The Iberians in Asia Minor.

T. Symes Pridéaux.—On the Principles of Ethnology.

Sir James Alexander.—Notes on the Maories of New Zealand, with Suggestions for their Pacification and Preservation.

The Duc de Rousillon.—On the Scythians.

W. Martin Wood.—The Hairy Men of Jesso.

Captain Algernon De Horsey, R.N.—On the Comoro Islands.

John Cameron.—On the Islands of Kalatoa and Puloweh.

Keith E. Abbott, Consul-General at Teheran.—On the Province of Azerbaijan.

Sir George Bowen.—Advance of Colonization in North-Eastern Australia.

Excursions, numerous attended, were made to Stanton Drew and Radstock, Frome, Bristol, and the Clifton Suspension Bridge, Salisbury, Old Sarum, and Stonchenge.

At a meeting of the General Committee held on Monday, it was decided that the next meeting of the Association will be held at Birmingham, under the Presidency of Professor John Phillips, F.R.S., Professor of Geology in the University of Oxford.

### Fine Arts.

ART IN BELGIUM.—The following notice of art exhibitions now being held at Malines and Brussels has been kindly contributed by Mr. John Leighton, F.S.A.:—The exhibition of objects of religious art in precious metal, wood, ivory, and embroidery, now to be seen at Malines, the ecclesiastical capital of Belgium, was formed there on the occasion of the late Catholic congress, though not completed as a show until the latter part of this month. It says much for the liberal spirit animating the venerable religious corporations on the continent to allow of their being seen by the world at large at all, and that in a secular edifice. The works exhibited consist of implements, utensils, and robes used in the offices of the Roman Catholic church—from the period of the middle ages to our own day—and are exposed to view in an ordinary mansion, the Hôtel Liedekerke, Rue de la Blanchisserie, Malines; and will remain open until October 15th (three weeks longer than was contemplated in the first instance), allowing persons to examine the collection with a complete catalogue—an advantage not enjoyed by the first visitors. It is a great pity that such a fine collection should be shown in the inconvenient chambers of a dwelling house, where nothing is to be gained by *ensemble*, and the watching is rendered difficult; why not have shown them in some of the fine mediæval halls for which Flanders is so famous? For instance, how glorious would the magnificent but deserted hall at Ypres have looked, put to such a purpose. The want of a large hall has been greatly against the effect of the exhibition, that as a show would have been vastly more popular in Belgium, had it been at Brussels or Antwerp; not but that Malines has charms for the antiquary and artist, the capital or seaport could not offer. But in a collection—where the art value, the historical value, and monetary value are alike great—one feels at a loss where to commence even in noting a few objects. Whether to begin with the processional crosses of large size, or the Byzantine crucifixes from the earliest date, enamelled and set with crystals, or with the ivory Jesus of the Renaissance period, fixed upon a cross of ebony, full of the vigour and drawing of Rubens' school, or with the pastoral staves—including one of ivory of the sixth century, or with the Diptiches of the eighth and ninth centuries, or with the Monstrances. Of these, as others, some of the best designing will be found in combination with the roughest work, and *vice versa*. Those numbered 406, 421, 438, (old) and 416 are fine; one from St.

Jacques, at Louvain, and another from Ghent, of the sixteenth century, particularly good—for the period. Of old book covers there are two remarkably early examples, from Tongres and Namur; the one from the *Sœurs de Notre Dame de Namur*, being both beautiful and marvellous for variety of design, material and workmanship. There is a very fine chalice (344) and an altar cover of Frère Hugo de Oignies which is curiously beautiful—as also a chalice of St. Thomas à Becket. Of Reliquaries many are unique and interesting, though often very quaint in their forms, the finest, perhaps, being that of St. Chandelle, of Arras (twelfth century). The “St. Epine,” containing a thorn from our Saviour’s crown, was presented by Alexander of Scotland to St. Louis. Mary, Queen of Scots, in 1587, gave it to Elizabeth, daughter of the Earl of Northumberland on the scaffold, by whom it passed to the English college, at Watten, and, upon the suppression of religious houses, came into the keeping of the Bishop of Ghent. There is also a reliquary, in gold, adorned with precious stones and enamel, that once belonged to Margaret of York; and others containing wood from the true cross; portions of the veil of the Virgin: the tooth of St. Nicholas, &c., &c. Of shrines there are many, from a very early date, of gold, of brass, enamelled, jewelled, and otherwise decorated. To enumerate all the remarkable enamels (either cloisonné, Limoges, or other), nielli and *repoussé* work, would be fatiguing; or to tell of all the silver and brass candlesticks, the coronæ, the silver and gold crowns for statues here were impossible. There are a small Mosaic of Roman work, presented by Sixtus IV. to the Prince of Chimay, numerous rings of abbots, religious houses, &c., including one of Sir Thomas More’s, and a remarkably fine collar in silver—very picturesque and quaint in its treatment—belonging to the goldsmiths’ guild at Ghent. Of embroidered fabrics and priests’ vestments there is a grand show, including a tunic of St. Bridget, left by Gunilda, the sister of Harold, to the Cathedral of Bruges; two chasubles that belonged to St. Thomas à Becket, from Tournay, including some of the Renaissance period; whilst in the lower rooms are to be seen some magnificent modern specimens of work, but of inferior design compared with the earlier examples. In modern work, the continental art-workman is pre-eminent, the fault being in the design, which, if good, is apt to be very French, tending to the Renaissance; the fact is, continental architects do not seem to be imbued with a purity of Gothic feeling, being influenced by their own Flamboyant style, which, whilst rich, has not the marked and simple character of the work so well understood of late years by us. It is to be hoped that this exhibition will open the eyes of the Committee of Public Monuments in Belgium to the importance of preserving their monuments and domestic architecture, and encourage a taste wanting it is to be feared, in the upper classes abroad, if we may judge from the poor modern French edifices that are gradually taking the place of the stately old Flemish mansions, of which happily there rest so many examples, though many of them are choked with paint, the leaded windows having given way to large plates of glass in the casements. This is not to be wondered at when the Committee of Public Monuments are themselves painting “stone colour” the lofty and rich tower of Malines Cathedral, and where they do not destroy—restoring with a vengeance—removing in many cases work of great value, for a modern edition which, however clever, must always be a copy, and never can have the qualities of the original. As to the timber houses, they are fast melting away—in Ypres alone some hundreds having disappeared within a few years, as may be seen in the Musée of that town, where they have a nice collection of drawings, by M. Böhm, after the best of them. To that zealous antiquary, Mr. W. H. James Weale (our countryman), who has settled in Flanders, the Belgians are not alone indebted for the exhibition at Malines, but for many manuals and works on the antiquities and art treasures contained in that most interesting kingdom.

Whilst at Malines they have an exhibition of Mediæval art, at Brussels will be found another, somewhat novel in its character, an international exhibition of cartoons, including photographs from colossal drawings in monochrome; the display being held in a temporary building of wood, situated at the rear of the Royal Palace, containing many works of a remarkable character, most of them having been used in the preparation of mural decorations—bearing the marks of the pounce holes and the stilus—an interesting show of a practical character, and not unpopular, if the attendance may be taken as a test. They are of all shapes and sizes—from large spandrels to long friezes—the grandest big as a house, the smallest fit for a book illustration. At the end of the Grand Salon is placed Kaulbach’s enormous work, “The Reformation,” where Luther, standing in the centre, holds aloft the Bible, which sheds its rays around upon the heroes of the period, our own Shakespeare forming a prominent figure in the foreground. Echter has two designs, I believe executed for a railway station, “The Telegraph,” and “The Locomotive;” Müller, of Dusseldorf, many religious subjects; Guffens, of Antwerp, several historical incidents connected with that city; Van Orsel, the drawings used by him in the decoration of the Church of Notre Dame de Lorette, at Paris, which is not the most distant capital that sends, for there are several from Vienna and Berlin, including some large and small landscapes, of great power, in black and white, on paper. Of the Antwerp Salon, it may be remarked that it is above an average exhibition—but few of the leading masters of the Belgian school being absent—an exhibition that for arrangement and practical quality would put our Royal Academy to the blush; though an ancient corporation—an academy twice as old as our own—it exhibits many more works and that fairly—none being placed too high for observation—or, where large, above two lines in height; all being in black wooden boxes, that greatly preserve the frames, and make the sides square, much aiding the general effect, the fine fillets of wood between the works filling up the space very agreeably. Of sculpture there is but little and that well displayed; a portion of it with the pictures, but somewhat isolated, to prevent violent contrast. In architecture there are many beautiful drawings, though none are “pretty;” ground-plans and elevations are included; whilst of engravings, lithographs, and other works of Fine Art, there is a good show; even to works in chased metal, the place of honour being devoted to a clock case with figures in relief, a most able work in the round, as vigorous as if from the hand of Quintin Matsys. The Exhibition was well attended on the Sunday morning at one franc, though in the afternoon it would be free to the public in general.

THE LOUVRE.—Immense additions and improvements have been made this year, and are still being made, in the galleries of the Louvre. The “Musée Napoleon III.” presents something new every month. The opening of the principal rooms of this collection has been already referred to, but only in very general terms. The largest of these has an interesting history of its own; it was formerly known as the *Salle des Séances*, and is now called the *Salle des Terres cuites*. It is not one of the original rooms of the edifice of François I.; in his time it formed two apartments, one being used for the *Tribunal des chasses*, where all matters connected with the chase were discussed and settled; the other contained the collection of naval models. In 1755, these two rooms and those above them were all thrown into one, making a fine hall, and under the government of Louis XVIII. it was used for the ceremony of opening the chambers, whence its late name. The new *Salle des États*, in the new portion of the Louvre, was built, and is now used, for the same purpose. It was in this room that the *Musée Napoleon III.* was commenced, but until lately its contents were of a heterogeneous character. The alterations and decorations recently completed are very judicious

and elegant; the false ceiling, which was a mere decorative painting on canvass, has been replaced by one of ground glass, which has produced an extraordinary improvement, not only as regards the amount but also the disposition of the light, that falling from above doing away with the shadows which formerly arose from the deep embrasures of the windows and the projections of the glass cases. These latter are of polished ebony, and with the antique red colour of the walls and the liberal gilding of the ornaments produce a very charming effect. Beneath an ornamental architrave stands a reproduction in bronze of a well-known figure of "Victory," by Brescia. In the centre, on open stands, is a noble collection of Etruscan vases and sarcophagi of large size and of the most remote epoch. The vases were made simply to hold water, oil, or wine, but the purity and elegance of their form renders them worthy of being placed in the first rank of ceramic ware. They are, moreover, ornamented, by mouldings on the clay before burning, with circles, geometric figures, friezes representing sphinxes, sacred animals, and hunting scenes, all exhibiting an amount of art applied to vessels of common use that shows a high state of artistic feeling. The series of sarcophagi includes specimens of all sizes; the largest are surmounted by figures of the deceased occupants, lying on the funeral couch and holding in their hands the symbolic crown indicating that the circle of life is closed. In some instances the figures are crowned, and have a collar around the neck; these are supposed to imply that the occupants were enrolled in the list of *Dieux manes*, or saints. One of these large sarcophagi is peculiar; the figure of the defunct lies supported on the left arm, holding in one hand a patera, and in the other a *flabellum*, or sprinkler of libation, in the form of a lotus leaf; around the funeral couch are five winged genii of death, and the sarcophagus is decorated with a running ornament composed of griffins and sea-horses, fabulous animals, supposed to convey the dead to the happy isles. All these figures are separate, and may be detached from the sarcophagus, which is closed by another moveable ornamental piece. The small sarcophagi are in the same style as this last, but in their case the ornaments are much more elaborate; they generally represent warlike episodes, such as the battles of the Centaurs and Lapithæ; the combat between Eteocles and Polyneices, &c. One only represents a domestic scene, a man and woman lying on a funeral couch surrounded by their family and slaves, in accordance with the habits of the time, the slaves being represented as children. Some few of the sarcophagi are not of clay, but of marble, and in the case of the latter the sculpture is of a very superior character. One design includes ten figures, and represents the carrying off of Helen. Some of the heads are gone, but what is left is full of beauty and ease. One specimen, probably more recent, or the work of an inferior artist, represents a family travelling in a chariot drawn by two horses, coupled by a yoke, the head of the family leading on horseback; the details are curiously elaborate, but the execution is very poor. Other examples are ornamental with historical or mythological subjects, such as Orestes pursued by the Furies; Charon guarding the gate of the infernal regions; and the sculptures in general bear marks of colour in which blue and bright reds predominate. The other works in terra-cotta are enclosed in glass cases placed against the walls; these are of larger size than those on the sarcophagi, and served for the decoration of temples; some are separate, while others form friezes. The subjects are all from the Greek mythology, the most common being the labours of Hercules, the exploits of Theseus, and the doings of Jupiter, Bacchus, Minerva, Apollo, and the Seasons—Autumn being accompanied by a pig, Summer by corn, and Spring by flowers. These bas-reliefs form really an exquisite gallery, and some of the sculptures are of high value, and will doubtless attract the eyes of all artists and connoisseurs who may visit the Louvre. Amongst the most remarkable are:—Medea

poisoning the dragon, while Jason seeks the golden fleece; Ulysses and the Syrens; Ariadne lying on a panther; several combats of Amazons of great beauty; and Perseus delivering Andromeda, a composition which it would be difficult to match in the whole round of art, antique and modern. With these friezes and metopes are a number of specimens of running frieze mouldings, used to finish off the walls and hide the edges of the tiles; these are ornamented with heads of gods and goddesses, and of animals, masks, leaves, and flowers, and are the perfection of ornamental modellings. The sculptor must either have executed them *in situ*, or he must have studied with great care all the circumstances of their intended position; their coarseness when viewed nearly, and their beauty at a proper distance, are equally remarkable. A smaller room adjoining contains an exquisite collection of small works, brought from Tarsus by M. Victor Langlois, when on a mission for the Government. These consist of statuettes, collars, funereal ornaments, comic and other figures, to be worn as ornaments, buffoons, and what not. They are full of life, movement, and comicality, and marvellously executed. Amongst them are some objects of greater importance; a small bull, for instance, in the best style, female heads of great beauty, and heads of men remarkable for their vigour and the amount of character exhibited in small compass. Lastly, there is a fine collection of jewellery, exhibiting everywhere indications of true artistic genius—rings, bracelets, earrings, light and graceful as can well be imagined, and leaving our modern artists and artisans little cause to smile at the works of the elegant purveyors to beauty who lived twenty centuries ago. The Pope has just sent to the Emperor the lance which was found in the tomb of Charlemagne; this will be placed in the *Musée des Souverains*, in the Louvre.

## Manufactures.

"GREENBACKS."—In the Washington correspondence of the *Cincinnati Gazette* is given the following description of the manner in which the manufacture of these notes is effected:—To obtain access to the note-printing bureau requires a pass from the Secretary of the Treasury himself. For obvious reasons it is a privilege rarely granted, and never except under the most thorough surveillance. No lady not employed upon the work is ever permitted, under any circumstances, to enter that part of the department. If for no other reason, the crowded machinery would make it dangerous. The machine shop is the first room entered; it is supplied with forges, lathes, planes, and drills, capable of doing all the repairing necessary to be done to the machinery of the building, and to the setting up and working of such new machines as are demanded by our extensive paper circulation. The paper mill, though not as extensive as one for general manufacturing, is sufficient for all the labour required in making the note printing paper. The manufacture of a paper combining the qualities of wear, and being splitless and unphotographic, was a much-desired desideratum. Accordingly, it was resolved to make some experiments, which were entrusted to Dr. Gwynn. He has produced a paper as firm as parchment, smooth as satin, and of a combination of materials known only to himself, and secured to the exclusive use of the Government. He has introduced into it a fibre which cannot be photographed without discolouring the paper to which impressions may be transferred, giving it the appearance of a coarse, black spider-web. Being moulded into the body of the paper, it is impossible to erase it, and it must be a great preventive of counterfeiting by the photographic process, which has lately been the most successful. The ink mills are six in number, for making as many different colours. Each one is called a 4-horse power mill, though the whole six are driven at the same time by an engine which one could

pick up with one hand. It not only turns these mills, but at the same time runs three Hoe cylinder presses. It was made in the machine shop of the department, and derives its force from its great boiler capacity. The engraving room is of more interest than any we have yet been in. Here science and art are both displayed to perfection. There is, perhaps, no engraving so fine, and requiring so much time to execute, as that on the plate now being prepared for national note-printing. One, the size of a bill, on which the workman has been employed almost a year, is a copy of one of the paintings in the rotunda of the Capitol. The figures are of exquisite proportions, and the water-lines, though plain, extremely delicate in their tracery. With the single plate, as it comes from the hands of the engraver, it would be impossible to do the printing required, and as it is equally impossible to have a number of plates engraved, it becomes necessary to repeat them in another way. This is done in the following manner:—The engraving is done on a plate of soft steel, just the size of the bill or bond, and the cuttings are indentations. When finished, the plate is hardened and taken to a "transfer press," where a roller of soft steel, just of a circumference to take in the size of the plate, is rolled over it under heavy pressure, leaving the impression on the roller in a raised form. This roller is in turn hardened, and then any number of flat plates similar to the original are prepared and receive in like manner the impression from this roller, and become *fac-similes* of the plate engraved; and we have produced in a few minutes what it has taken months with chisel and eyeglass to make! The printing is now done on the old-fashioned engraver's press, being nothing more than a simple iron roller, covered with cloth and paper, to press the paper into the indentations, placed in a strong frame, and turned backwards and forwards by hand, by spokes placed in the end of the roller. Two persons work at each press—a man and a woman—the former attending the plate, the latter the paper. The plate is kept warm while working by a gas heater. The sheets when printed are each laid between other sheets of thin brown paper, to keep them from blurring, and sent in hundreds to the drying-room. The first process of bond printing is numbering the coupons and the denomination with a yellow mordant, and, as they fly from the press, they are bronzed, as they appear when issued. Yellow is used because it cannot be photographed without showing too plainly to be mistaken, as was remarked about the fibre in the paper. This discovery was made in the following manner:—When Mr. Clarke was at the head of the Bureau of Construction, he had a map made for military purposes, which it was necessary to repeat. It was photographed, and an obscure road marked with a faint yellow line was discovered to be black in the copies. He then photographed a specimen sheet of inks or paints, and of all the colours, except black,—yellow was the only one which might not have been altered with ease with a touch of the brush. It was black as the black ink itself. Hence any attempt to photograph this colour will only lead to discovery—and, as it is the groundwork of bonds and other securities, and covered by the printing, it seems another security against fraud. The series-numbering is the last process before trimming. The work is done by women, the machines being worked by a treadle. The figures are placed in the edges of six discs, placed side by side, and fastened to an arm worked by the treadle, something after the style of a Wheeler and Wilson sewing machine. The discs are turned by a ratchet, and will number from 1 to 999,999. For consecutive numbering, a little hook is attached to the ratchet, and the machine shifts itself. Otherwise, the discs are turned by the number. The trimming and cutting was formerly done by hand, and of course very imperfectly and laboriously. There were two things to be overcome in cutting by machinery—the inequality of the register and the shrinkage. It was desirable that the edges should be trimmed, that they

might wear well. If cut with a straight knife they would be bevelled one way. As they are now cut, with circular knives, they have an edge bevelled both ways. The greenbacks are printed four on a sheet. One machine trims the margins, and another separates them. This latter is an ingenious contrivance. It slits them very fast, and lays them regularly in a box, each series of numbers separately. The notes are lettered A, B, C, and D, and the numbers on each are the same; therefore it is essential they should be kept carefully apart. Each of the boxes that receives them has a moveable bottom. When the cutting for the day first commences, this bottom is near the top of the box, but as the cutting progresses and the number of the bills increases, a ratchet lets the bottom drop the thickness of a bill, so the box is kept just so full all the time to make a bill slide in without doubling. It is intended that the cutting should be a criterion by which to judge of the genuineness of the bills, for every one must be the same width and length. If the end of a bill be placed on the centre of another, there will be found no difference in the width—an exactness which cannot be given by the hand. The currency-cutting machine is more complicated, as it cuts both ways, and files them in bundles of five dollars each, and I am not sure but it binds and seals them. Wet printing is the process now used in this establishment. The wetting is done by cloths instead of by dipping or sprinkling, as in newspaper printing. A room is prepared especially for this, with iron weights for pressing. Each man has his particular place assigned him, and all work in harmony, and with precision and celerity. Ordinary bills are wetted and dried three times during the printing; but this process will soon be done away with, for preparations are being made to substitute dry printing in its stead, in which there will be at least two advantages—speed and better work. To do this some eighty heavy hydraulic printing presses are being set up, when what is called dry-printing, or printing on dry paper, will, for the first time, be successfully performed. There is a very perceptible difference between the present way and the one to be substituted. Specimen sheets show a clearer impression and a remarkable distinctness with which the faintest water-line is made to stand boldly out. This process, which is entirely new, has only been introduced after the most vehement and virulent opposition. All sorts of stories were circulated of the building being crushed down, of there being an impossibility to take with a machine more than seventy-five impressions per day, and a hundred others of a similar character; but, inviting men of judgment and skill in machinery to test the feasibility of the plan, Mr. Chase went on and instructed Mr. Clark to continue the experiments and perfect the system. The first tests were made with hand pumps. Machine pumps are now being rigged, and the whole will soon be in motion. The checks and safeguards upon everyone employed in this department, from the chief down to the lowest labourer, operate at every turn. Not even a blank sheet, much less a printed one, is passed from one hand to another without being counted and receipted for; and unless there is collusion from one to another through every process through which the paper has to pass before it is money, through the entire range, there cannot be an over-issue. The paper is issued from one room, and is re-issued from that room sixteen or eighteen times before it is put into circulation; being counted, charged, and receipted for each time, and re-counted, re-charged, and receipted for through each process that it passes after leaving this room. Five hundred persons are employed in note, bond, and currency-making. It would seem as if this number ought, in a month's time, to turn out money enough to carry on half-a-dozen such wars as we have on hand. But a million of dollars in notes of the required denominations to do the current business of individuals, is an immense pile of paper, and when it comes to hundreds of millions, they grow into small haystacks as to size. By the present

process of printing each pressman takes about five hundred impressions per day. By the hydraulic presses, it is expected that from three to five hundred impressions per hour will be taken.

**COTTON.**—16,000 kilogrammes of raw cotton, grown in Persia, have arrived at Rostow, on the Don. This is a first experiment made by manufacturers in the central provinces of Russia.

**THE FLAX TRADE.**—Mr. Baker, one of the Inspectors of Factories, in his last report, says that this trade is, to all appearance, exceedingly prosperous, and every spindle and loom is working full time. The efforts for flax cultivation are likely this year to be most successful. It is said that 300,000 acres have been sown in Ireland, and that large imports of flax will enable the manufacturers to tide over the time till our own growths are available. The words "to tide over the time" are quoted from a Belfast letter, as one of the strongest proofs of a possible scarcity of flax as well as cotton. By a return recently made to the Belfast Linen Trade Committee by the mill occupiers, it appears that, though there are eight fewer spinning mills in 1864 than there were in 1859, and 1,098 spindles less, yet that there is an increase of fourteen per cent. more spindles at work in the latter than there were in the former year. Moreover, there are five new mills in the course of erection, capable of containing 45,000 spindles, in addition to an extension of spindles in the present mills of 50,638, making a total increase of spindles 95,638. With respect to linen power-loom weaving, it appears from this return that in 1859 there were only twenty-eight weaving factories, containing 3,633 looms, whilst in 1864 there are forty factories, containing 8,187 looms, or an increase in five years of upwards of 125 per cent. Such is the result hitherto of the great efforts which have been made to prosecute successfully the flax manufacture in Ireland, a manufacture which carries agriculture along with it, and enhances both. In England, on the contrary, between 1856 and 1862 the flax spindles decreased upwards of twenty-eight per cent., and although we could have grown all the flax we needed at home, we have been content to import it, and to pay to the foreign farmer what we are now beginning to see might as well have been distributed amongst our own people. It is hoped, however, that the attention of our English farmers has now been sufficiently directed to the subject; for though there may be some differences between the soil of England and Ireland as to their applicability to flax culture, and in the price of agricultural labour between the two countries, yet our agriculturists may rest assured that the Irish farmers are alive to their own interests, and that a specific culture would not have increased by upwards of 60,000 acres for two years in succession, unless the advantages had been commensurate with the risk and outlay. In addition to the great improvements in machinery, whereby it is intended that the scutching process shall not only be economised and perfected, but brought home to the farmer's door, it is stated that a new process of retting has been discovered, whereby the flax, when grown, can be brought to market much more readily than under any former system. It can now be retted in a few days, it is said, in the most costless manner, without prejudice to the fibre—indeed, with actual advantage to it, and without the offence which line ponds are apt to communicate to a neighbourhood, both in the air and in the flesh of the animals which happen to feed in or near them. If this is so, a great stride in flax culture has been made.

### Commerce.

**CULTIVATION OF TEA.**—A Sydney paper recommends the attempt being made to cultivate tea in Australia. It says:—"The tea-plant grows very well in the Botanical Garden at Brisbane, and there are many parts of South Australia where it would grow equally well. China has

so long had the monopoly of the tea trade, that people have come to think that to China alone we must continue to look. There is nothing special in the climate or soil of the tea-growing districts in China—nothing that cannot be matched elsewhere. The greatest progress in tea cultivation is being made in India, where, on the slopes of the Himalayas the cultivation is being carried on with great energy and success. The drawback to tea cultivation is, that some years are required before the first returns come in, and that, therefore, some patience and capital are requisite to enable the grower to wait for the fruits of his labours. The value of the tea exported from India has risen from £17,244 in 1842, to £192,242 in 1862. It has taken a long time, however, to give this industry a thorough start. It was in 1834 that the Government first directed its attention to the subject, and instituted inquiries which ultimately led to the formation of a plantation. Thirty years have elapsed since then, though the cultivation is now beginning to assume great commercial importance. We have the advantage of some Chinese labour which might be turned to account, and if we could add Anglo-Saxon capital and enterprise to the patient, plodding Chinese, we might perhaps get at results that would surprise us."

### Colonies.

**THE QUEENSLAND SHEEP INVESTMENT COMPANY.**—A Sydney paper says:—"A new Anglo-Australian Company, under the title of 'The Queensland Sheep Investment Company,' has been brought before the public. The capital is to be £400,000, and the object is to buy and work sheep runs, chiefly in Queensland, but also in the other colonies. There seems to be a rage in England for forming new companies, and, under these circumstances, it is only fair that Australia should come in for a share of the golden shower. There is room for a judicious investment of English capital in Australia, and the process may benefit the colony as well as the investors. The latter may draw good dividends, and the former may enjoy to advantage the use of the capital. Not that everybody will be gratified. We have a class of politicians amongst us who cordially detest all Anglo-Australian companies, because they look upon all dividends sent to London as so much profit of which the colonists have been robbed, forgetting the capital that was first sent out to earn the dividends, and that the productive employment of that capital has stimulated local trade, and left a margin of local profit that would not have existed but for the importation of the capital. Local lenders of money do not care to see English capital venturing here, because it tends to reduce the local rate of interest; and local purchasers do not care to have to buy properties in competition with the agents of English companies. But, though there are some interests in favour of close markets, the colony, considered as a whole, gains by every importation of English capital which can be profitably invested. English investors, however, will do well to exercise caution as to the colonial ventures they make. Many companies have been got up which have been little better than swindles. Flaming prospectuses have been issued in London, which, when read on this side of the world, where both the properties and the vendors were known, have excited no small astonishment at the gullibility of the British public. Lands and mines of an alleged fabulous productiveness have been sold to credulous shareholders, and have never yielded a profit equal to the value of the parchment by which the fee simple was conveyed. Such instances, which unfortunately have been too frequent, ought to make buyers cautious. But there are always dupes to be found. It would be a safe rule for English buyers never to purchase a colonial property on the recommendation of the seller merely, however plausible may be his description. I

the property is really worth the price asked for it, it will bear inquiry; and a *bona-fide* vendor would not object to a conditional sale dependent for its ratification on the approval of some reliable colonial referee competent to advise the buyers as to expediency of the purchase. With some such guarantee as this as to the soundness of the investment, there are many things into which English capitalists may freely place their money in these colonies, and draw therefrom a steady and lucrative return."

INTERCOLONIAL TRADE.—An Adelaide paper states that this has assumed a briskness which has not been paralleled for a considerable period. This may be attributed to the shortness of crops and the exhaustion of the stocks of bread stuffs in the adjacent colonies. Besides the regular trading steamers to Melbourne fully employed, there are sailing vessels forming quite a fleet, their tonnage amounting in the aggregate to about 6,000 tons.

### Obituary.

CAPTAIN JOHN HANNING SPEKE, the discoverer of the source of the Nile, was the second son of Mr. N. Speke, of the Jordans, near Ilminster, Somerset. He was born in 1827, and entered the army in 1844. In 1854-5, in conjunction with Captain Burton, he undertook an exploring and hunting expedition in Somali Land and other parts of Africa, and there suffered severely from wounds inflicted upon him by the Somali. In *Blackwood's Magazine* he subsequently published an account of his adventures. After his return to England, in the summer of 1855, he joined the Turkish Contingent, and proceeded to the Crimea. When the war was closed he projected an expedition to investigate the *Fauna* of the Caucasus, but abandoned the plan on receiving an invitation to rejoin his old leader Burton in a new expedition to Africa. It was while on this expedition that he first heard, from an Arab merchant, of the existence of the Victoria Nyanza, for which discovery he received the gold medal of the Royal Geographical Society. This was in 1858. Captain Burton at that time lay sick at Kayek. Leaving his leader, Captain Speke penetrated to the Nyanza, and found its waters were sweet, and that it was three or four thousand feet above the level of the sea, on the high plateau-land forming the watershed between Northern and Southern Africa. He thereupon became convinced that this body of water must be the great southernmost reservoir, out of which the White or Main Nile flowed at its northern end. He then returned to England. Sir Roderick Murchison strongly encouraged him to enter upon a fresh journey. Assisted by the Geographical Society and by the Government, Captain Speke enlisted Captain Grant in his project, and these two officers followed the Nile from its source to its mouth. He was killed on Thursday, the 15th inst., by the accidental discharge of his gun, while shooting in Wiltshire.

CHARLES WENTWORTH DILKE, Esq., died August 10, at Alice Holt, Farnham, the residence of his son, Sir C. Wentworth Dilke, Bart., aged 74. Mr. Dilke was born on the 8th December, 1789, and at an early age obtained an appointment in the Navy Pay Office; being fond of literature, he turned his leisure to good account, by writing for reviews and magazines; and in 1814 edited a valuable collection of old plays. In June, 1830, he became part proprietor of the *Athenæum*, and for sixteen years was sole editor. This paper, commenced by Mr. Silk Buckingham, in January, 1828, had long been conducted at a loss. Mr. Dilke, in conjunction with one or two friends, purchased it, and after a few months they were able to announce a most favourable prospect of ultimate success; but his partners were alarmed at the steady drain on the funds, and the major part retired. Like the *Literary Gazette*, the price was 8d.; in August, 1831, the proprietors reduced it to 4d. The experiment was a bold one, but

Mr. Dilke argued, "if the readers of literary papers be so few as some imagine, who were the 30,000 purchasers of the early volumes of the Family Library? Who the 14,000 purchasers of the Lives of the Painters?—a subject limited in its interest to the highest and most refined class of informed minds." Taking this wide and comprehensive view of the literary public, the *Athenæum* of August 6th came out at 4d. All the back numbers were reduced to the same price. Most of the leading publishers held aloof; several of them being more or less connected with journals of their own; and amongst the advertisers in this number, are only found the names of Fisher, Tilt, Whittaker, Parker (Oxford), Strange, Kidd, Boone, Hailes, and Moxon, besides Cochran and Co., who took the back page—nor did the large publishers come in for some time. Mr. Dilke did not, however, rely upon lowness of price exclusively for success; but sought the aid of many of the literary celebrities of the period; and among the known contributors, as early as 1832, are the names of Thomas Carlyle, The Ettrick Shepherd, Allan Cunningham, T. K. Hervey, Thomas Hood, Leigh Hunt, Charles Lamb, William Roscoe, and others. Talent and lowness of price thus combined secured a large influx of literary readers. The first six numbers for the year 1832 were reprinted in rapid succession. This seems to have induced the editor to introduce into his journal a series of articles on the Literature of the Nineteenth Century, as some data for current reading. These articles were given in extra sheets, without additional cost, and comprised: English Literature, by Allan Cunningham; French, by Jules Janin; German, by Dr. Wolff; Spanish, by Don. A. Galiano; American, by Rev. Timothy Flint; Ottoman, by Von Hammer; Polish, by Stanislas Kozmian; and Arabic and Persian, by Meezra Ibrahim. Mr. Dilke appears to have been ever on the watch for special matters of literary interest, hence the purchase of Joseph Haslewood's manuscript relating to the celebrated Roxburghe Revels, the publication of which in the pages of the *Athenæum* attracted so much attention at the time. Having brought the journal to a foremost position, Mr. Dilke in 1846 entrusted the editorship to Mr. T. K. Hervey, only occasionally contributing articles on the literature of the eighteenth century, having reference more especially to Pope, Wilkes, and Junius. Mr. Dilke did not remain long at rest; the first number of the *Daily News* was issued on the opening of the Parliament for 1846, and the talent employed, together with the ample funds at its command, seemed to anticipate the very best success. In a few months, however, these anticipations were dispelled, and in the difficulty Mr. Dilke was consulted, and ultimately consented, in connexion with his son, now Sir Wentworth Dilke, by whom he has been always ably supported—to take its management for a limited period. He accordingly introduced into that newspaper the free and independent spirit he had infused into his own journal, and at once reduced the price from 5d. to 2½d.—It must be borne in mind that this was virtually to reduce the price to 1½d., as the compulsory 1d. stamp was then in full force—thus the *Daily News* became the forerunner of the cheap daily press. The boldness of the prospectus issued by Mr. Dilke, read by the light of our every-day experience, is singularly instructive. A few words of extract may be of interest. "The newspaper is the intellectual life of the nineteenth century—the great agent of modern civilization. Not to speak of the moral and political safeguards which it affords, it places all, whatever their varieties of fortune and position, on a level as to information. By its means only, the capitalist is enabled to contend successfully against his wealthy rival for a knowledge of those changes which affect supply and demand, and, therefore, prices. The number and character of the newspaper press of any country are an admitted test of the enterprise and intelligence of the people." The first issue at the reduced price took place on the 1st of June, 1846, and reached a sale of from twenty-five to thirty thousand copies. For



several years previous to his death Mr. Dilke had ceased to take any active part in journalism; but, shut up in the retirement of his library, he worked incessantly, his chief studies being the History of England under Queen Anne, the authorship of the Junius letters, and the Pope mysteries. It is to be hoped that these researches of his later years may at some future time be issued for the public service. The remains of Mr. Dilke were privately interred at Kensal Green, on the 16th ult., followed to the grave by members of his family and a few of those friends who had known him well and respected him in life. Amongst those present were Mr. Hepworth Dixon, Mr. John Forster, Mr. James Holmes, Dr. Doran, Mr. Thoms, Mr. John Francis, and others. Twelve of the oldest employés from the printing establishment also paid their tribute to the memory of the deceased by their presence. He was elected a member of the Society of Arts in 1849.

### Publications Issued.

LES INDUSTRIES PARISIENNES EN 1860, D'APRES L'ENQUETE DE LA CHAMBRE DE COMMERCE. (Statistics of Paris Industry, &c.)—This is a very important work, the result of an inquiry set on foot four years ago by the Chamber of Commerce, and fills more than eleven hundred quarto pages. It is the result of the joint labours of M. Moréno Henriques and M. Emile Cottenet, who have prefaced the work with an admirable *resumé* of the results of the inquiry. This is the second census of the kind that has been taken, the former having been commenced in 1847 and finished in the following year. The work now before us gives the total number of known industrial establishments in Paris at 101,171; of these 7,492 only furnish employment for more than ten workmen; 81,480 have from two to ten each; and the remaining 62,199 consist of small masters, who either employ one man or work alone. The total annual value of the productions of Paris is set down at nearly £185,000,000; the estimate—for it can only be approximate—in 1849 was 58½ millions. Of the former amount, the trades connected with food and drinks supplies 43 millions, clothing 18 millions, and the building trades 12 millions. The exports for 1860 are given at nearly £14,000,000, of which America took £3,000,000, England £1,390,000, and Russia rather less than a million sterling. The total number of working people is given as 416,811, of whom 105,410 women and 25,540 children, male and female. The average of wages is reported to be as follows:—64,080 workmen earn from one to three francs a day, 211,621 from 3 fr. 25c. to 6 francs, and the remaining 15,058 from 6 fr. 50c. to 20 francs per diem; of the workwomen 17,203 earn from 50 centimes to 1 fr. 25c.; 83,340 from 1 fr. 50c. to 4 francs; and 767 from 4 fr. 50c. to 10 francs per diem. The trades are thrown into ten principal groups:—1st, food; 2nd, building; 3rd, furniture; 4th, clothing; 5th, spinning and weaving; 6th, the common metal trades; 7th, gold, silver, and the other precious metals; 8th, chemical and ceramic manufacture; 9th, paper, printing, and engraving. The tenth is divided into several groups:—1st, instruments of precision, music, and clock and watchwork; 2nd, skins and leather; 3rd, saddlery and military equipments; 4th, brushes, brooms, &c.; 5th, ornamental wares (*articles de Paris*); 6th, miscellaneous employments, including balls and concerts, baths, hotels, &c., public vehicles, and the public establishments for slaughtering, prison workshops, the services of the sewers, streets, and the Imperial establishments for coining, printing, tobacco manufacture, gas works, theatres, &c. It is the comparison, not of totals, but more particularly of special employments, that gives these and other similar statistics a real value in the eyes of foreigners, and therefore the most prominent instances in each group have been extracted, giving the

number of workmen and the average rate of wages in each case:—The butchers number 2,697, are generally fed and clothed by their employers, and receive from 1 franc to 9 francs per diem wages; bakers, 4,489, earn from 1 franc to 8½ francs; distillers, 548, earning from 75c. to 8 francs; grocers, 2,624, wages from 50c. to 4½ francs; waiters and others in cafés, 4,068, generally fed and lodged in the establishment, from 1 franc to 10 francs; restaurants, 7,340 people employed, earning from 50c. to 10 francs, and living in the house; wine shops employ 5,378 persons, who earn 50c. to 6 francs, in addition to food and lodging; house carpenters, numbering 5,015, earn from 2½ to 12 francs; masons, 31,676, from 2½ to 12 francs; joiners, 8,792, from 3 to 10 francs; painters, 6,147, from 3 to 12 francs; iron workers, for building, 6,175, earning from 3 to 11 francs; bronze manufacturers, 2,339, from 1 fr. 75c. to 15 francs; bronze founders, 499, from 1 to 10 francs; bronze mounters, chasers, and turners, 1,441, from 1 to 7 francs; bronze gilders, lacquerers, &c., 914, from 1 to 7 francs; imitation of bronze in zinc, &c., 539, from 1½ to 15 francs; moulding and picture-frame makers, 1,764, from 1 to 9 francs; gilders on wood, 1,357, from 1 to 8 francs; cabinet-makers, 7,951, from 1 fr. 75c. to 12 francs; chair-makers, 3,421, from 1 to 10 francs; lamp-makers, 1,543, from 2 to 12 francs; iron bedstead-makers, 681, from 2 fr. 25c. to 18 francs; marble-workers, 1,620, from 1 fr. 25c. to 10 francs; paperhangings, 4,459, from 1 to 15 francs; decorative painters, 326, from 1½ to 20 francs; cabinet carvers, 707, from 2½ to 15 francs; carvers on wood for bronze and goldsmiths' work, 842, from 2 to 12 francs; upholsterers, 3,591, from 1½ to 12 francs; washmen and washerwomen, 9,574, from 1 to 8 francs; hosiery manufacturers, 3,223, from 50c. to 7½ francs; hatters, 3,354, from 1 to 15 francs; shoe-makers, 18,082, from 75c. to 10 francs; stay-makers, 2,254, from 1 to 6 francs; needlewomen, 5,191, from 1 to 10 francs; shirt-makers, 1,632, from 75c. to 10 francs; dress-makers (modistes), 3,352 men, from 1 to 10 francs, and 1,118 women, about the same, and boarded in addition; ready-made clothing, 2,617, from 1½ to 10 francs; tailors, 10,271, from 1 to 11 francs; shawl manufacturers (the imitation Cashmere and other kinds), 1,930, from 75c. to 20 francs; designers, 930, from 75c. to 20 francs; trimming-makers, 8,426, from 50c. to 9 francs; dyers of yarns and tissues, 1,007, from 1 fr. 25c. to 10 francs; weavers of all kinds of tissues except sacking, 2,488, from 50c. to 20 francs; boiler makers, 2,254, from 1 fr. 75c. to 15 francs; cutlers, 320, from 75c. to 7 francs; tinmen, 1,359, from 1 to 6 francs; metal founders, 4,026, from 50c. to 15 francs; machine-makers and engineers, 8,627, from 1½ to 20 francs; chemists, druggists, and herbalists, 1,601 pupils and workmen, from 1 to 8 francs; the greater part of the pupils and lads being boarded in the establishment; porcelain-makers, 235, from 2 to 20 francs; porcelain decorators, 1,872, from 75c. to 12 francs; chemical manufacturers, 1,749, from 75c. to 10 francs; glass workers, 933, from 75c. to 10 francs; line engravers, 139, from 1 fr. 75c. to 12 francs; wood engravers, 109, from 75c. to 15 francs; block cutters for printing stuffs and paper, 221, from 75c. to 7 francs; seal engravers (in metal), 625, from 50c. to 10 francs; lithographic and copper-plate printers, 3,219, from 50c. to 12 francs; letter-press printers, 6,158, from 50c. to 20 francs; book-binders, 2,499, from 50c. to 8 francs; watch and clock-making, and frame-making for ditto, 2,386, from 75c. to 12 francs; musical instrument makers, 928, from 75c. to 10 francs; optical and mathematical instrument makers, 3,108, 50c. to 15 francs; organ-makers, 1,513, from 1 to 15 francs; lighthouse-makers, 340, from 2½ to 12 francs; pianoforte-makers, 2,101, from 3 to 12 francs; curriers, 1,660, from 50c. to 2 francs; tanners, 1,286, from 1 to 9 francs; coachbuilders, business set down at more than a million sterling per annum, of which one-fourth is for exportation, employs 4,957 workmen, at 75c. to 12 francs; military equipment makers, 5,487, from 75c. to 8 francs; artificial flower-makers, amounting to a total



of considerably more than a million sterling per annum, of which about one-third for exportation, 7,831, from 50c. to 10 francs; hack carriages of various kinds occupied 1,845 persons, at wages of from 3 to 8 francs. Amongst the public establishments the following are the most important:—The abattoirs occupy more than a thousand persons at salaries varying from 1 to 17 francs per day; the clearing of the streets, sewers, &c., 3,543, the sweepers varying from 1 to 3½ francs, the waterers 2½ to 3 francs, and sewer men 3 to 4fr. 40c. The markets occupy 290 persons, paid by annual salaries, and 1,500 to 1,800 porters and 600 other persons, according to the season, at from 3fr. 50c. to 11fr. 60c. The Imperial printing establishment, 881 persons, at from 2 francs to 6fr. 50c. The Gobelins manufacture, 103, paid annual salaries (not given), and generally lodged and boarded in the establishment. The tobacco manufactory employs 3,140 persons, the average rate of wages being for the men from 3fr. 54c. to 3fr. 38c., and for the women from 1fr. 86c. to 2fr. 34c. per day. The theatres, of which there are 33 in Paris, give employment to no less than 2,588 artistes and assistants of various kinds, the total of their salaries and wages amounting in 1860 to 4,454,537 francs, or £178,181, while the administration occupied 439 persons, whose aggregate salaries amounted to 502,349 francs or £20,000, and 822 working men, whose wages averaged 5fr. 25c. per day. The gross receipts from omnibuses were 14,894,284 francs, or £595,671, and they occupied 2,430 persons at 2fr. 75c. to 5 francs, and 620 workmen, at an average of 4 francs per day. The total receipts from hack-carriages were more than £480,000, and gave employment to 3,793 functionaries, at salaries of from 2fr. 60c. to 5 francs, and 986 workmen, paid from 3 to 7 francs per day. The gas works employed 2,691 workmen, whose aggregate receipts amounted to £93,672 in the year, when the consumption of gas was 75,518,922 cubic metres.

### Notes.

ROYAL SCHOOL OF NAVAL ARCHITECTURE, SOUTH KENSINGTON.—The Committee of Council on Education, having appointed Dr. Woolley as Inspector and Director of Studies, and Mr. C. Merrifield as Principal; they have also named as Vice-Principal Mr. Purkiss, the Senior Wrangler and First Smith's Prizeman in the present year.

DISCOVERY OF A PAGAN SEPULCHRE.—An interesting discovery has been made in a private garden at Luben, in Prussia,—a place of Pagan burial has been opened up, and many curious relics brought to light. A number of funereal urns, ornamented with circles in various colours, were found to contain some bones and a large quantity of dust; other and smaller urns contain the bones of children. Beside these were found many household utensils, handles of swords or other arms, articles of glass, a broken statue of a divinity in clay, and a large number of bones of various kinds of animals. The urns were surrounded by large rough stones, and were placed separately in a bed of marshy soil, with their mouths turned towards the east. It appears that in past times the garden was washed by a lake which reached to the Chateau of Luben. The excavations are being continued, and the objects found are placed in the Museum at Breslau.

Eggs.—In the French agricultural paper called *Le Bèlier*, the following method is given for preserving eggs:—Dissolve in two-thirds of warm olive oil one-third of beeswax, and cover each egg completely with a thin layer of this pomade with the end of the finger. The egg-shell by degrees absorbs the oil, and each of its pores becomes filled with the wax, which hermetically seals them. M. Burnouf affirms that he has eaten eggs kept two years in this manner in a place not exposed to too

great extremes of temperature. He thinks also that the germ may in this manner be preserved for a considerable time.

### Patents.

From Commissioners of Patents Journal, September 16th.

#### GRANTS OF PROVISIONAL PROTECTION.

Air, &c., rendering substances less pervious to—2137—J. Stenhouse.  
Bells, sounding alarm or signal—2147—J. H. Johnson.  
Chimneys, machine for sweeping—2099—N. J. Peton.  
Fibrous substances, flyers employed in roving, slubbing, &c.—2163—J. Ivers and T. Ogden.  
Lamps, wick holders for—1271—H. Defries.  
Lint, manufacture of—2081—D. S. Brown.  
Liquids and fluids, apparatus for heating and evaporating—2088—A. A. L. P. Cochran.  
Malting, arrangements for—2177—D. Walker.  
Metal pipes, means of making the joints tight—2161—R. A. Brooman.  
Nails, manufacture of—2169—A. V. Newton.  
Ordnance and projectiles—2159—P. M. Parsons.  
Overcoat—2070—W. E. Gedge.  
Paintings, &c., glazing and varnishing—2143—A. Rollason.  
Paper, &c., applying liquid adhesive material, colour, &c., to—2132—A. Smith.  
Photographic prints, apparatus for washing—2079—J. E. Grisdale.  
Railways, prevention of collisions, &c.—2130—W. Clark.  
Railway trains, communication between passengers and guard—2075—T. Wray and R. Robinson.  
Railway trains, communication between passengers and guard—2151—J. S. Guy.  
Reaping and mowing machines—2187—W. A. Hunter.  
Reaping machines—2006—W. Brenton.  
Rolling mills—2036—W. Yule.  
Sewing machines—2090—J. M. Steinbach.  
Sewing machines, construction of—2173—M. A. F. Mennons.  
Ships of war and batteries, &c.—2067—J. Walker.  
Slubbing frames, &c., roving intermediate—2183—J. Bullough.  
Tube sheets, expanding tubes in—2171—E. R. and S. Lloyd.  
Watch protector—2185—E. Burgess.  
Water closets, &c.—2069—H. Wilson.

#### INVENTION WITH COMPLETE SPECIFICATION FILED.

Files, cutting of—2221—E. O. Potter.

#### PATENTS SEALED.

|                                      |                                       |
|--------------------------------------|---------------------------------------|
| 667. G. H. Openshaw.                 | 724. S. Berrisford and W. Ainsworth.  |
| 671. W. S. Longridge.                | 726. D. H. Barber.                    |
| 675. E. T. Wakefield.                | 727. J. Edis.                         |
| 676. J. Laverty.                     | 730. F. Tolhausen.                    |
| 680. R. Howarth.                     | 733. W. E. Winby and W. Wharton.      |
| 686. W. A. von Kanig.                | 734. W. Routledge and F. F. Ommanney. |
| 681. H. Wood.                        | 736. T. H. Head and H. Smith.         |
| 682. D. Dalglish.                    | 737. J. Strafford.                    |
| 688. J. Edmondson and T. Ingram.     | 739. F. Tyerman.                      |
| 689. T. Gamble and E. Ellis.         | 749. A. Blouin & N. D. Mercier.       |
| 690. L. A. Durrieu.                  | 770. M. Henry.                        |
| 691. B. Fowler, jun.                 | 815. W. E. Newton.                    |
| 694. G. F. Chantrell and J. Raymond. | 865. J. F. Sharp.                     |
| 696. J. Burrell.                     | 896. J. Dodge.                        |
| 699. C. Heywood.                     | 966. G. Haseltine.                    |
| 705. J. H. Albinson and J. Collier.  | 991. W. E. Newton.                    |
| 706. W. A. Martin & E. Wylam.        | 1061. S. Bateman.                     |
| 710. P. Berghaus.                    | 1240. J. Fletcher.                    |
| 711. J. Reilly.                      | 1446. J. Foxley.                      |
| 712. F. T. Moison.                   | 1625. T. Duffy.                       |
| 714. C. Hill.                        | 1777. J. Weeks.                       |
| 717. J. McMorran.                    | 1786. J. Clayton.                     |
| 718. J. Bennie, jun.                 | 1788. T. F. Hodge.                    |
| 719. J. Lawson & J. Lawson, jun.     | 1801. A. Dalzell.                     |
| 721. J. Leslie.                      |                                       |

From Commissioners of Patents Journal, September 20th.

#### PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

|                                |                                 |
|--------------------------------|---------------------------------|
| 2279. R. A. Brooman.           | 2301. M. Rae.                   |
| 2312. F. M. and E. L. Ransome. | 2316. F. Barnett.               |
| 2313. W. Tuxford.              | 2335. J. C. Coombe & J. Wright. |
| 2332. J. Gurman.               | 2339. E. Breffit.               |
| 2345. S. Hawksworth.           | 2342. J. H. Wilson.             |
| 2360. G. T. Bousfield.         | 2367. W. Tongue.                |
| 2273. W. Farlar.               | 2395. A. V. Newton.             |
| 2358. G. T. Bousfield.         | 2422. J. A. Knight.             |
| 2340. W. Clark.                |                                 |

#### PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

|                 |                    |
|-----------------|--------------------|
| 2414. W. Smith. | 2422. S. Faulkner. |
|-----------------|--------------------|